BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Study

Region: Pacific

Planning Area(s): Washington-Oregon, Northern California

Title: Survey of Benthic Communities near Potential Renewable Energy Sites Offshore the Pacific Northwest (PC-10-07)

BOEM Information Need(s) to be Addressed: BOEM requires knowledge of the seafloor environment and of biological communities that may be affected by renewable energy activities. Understanding species-habitat associations throughout the region will be a powerful tool to plan lease sales for renewable energy for the Pacific Northwest and for determining the nature and extent of further seafloor explorations.

Total BOEM Cost: $1,598,846 **Period of Performance:** FY 2010-2014

Conducting Organizations: Oregon State University (awarded through the Pacific Northwest Cooperative Ecosystem Studies Unit)

Principal Investigator: Dr. Sarah Henkel

BOEM Contact: Lisa Gilbane

Description:
Background: An agreement was made and entered into by the Department of the Interior, BOEM, for the purpose of scientific research that will provide a regional understanding of the distribution and location of physical properties and invertebrates on the seafloor for Federal waters in the Pacific Northwest. The wave and wind climates along the west coast of North America represent one of the best prospects for the development of offshore renewable energy, yet initial assessments of the potential ecological effects of wave energy have only just begun. This program of research on benthic invertebrate communities and habitats of the Outer Continental Shelf (OCS) off of Washington, Oregon, and northern California will assess baseline biological and geological patterns in areas of potential marine renewable energy development.

Objectives: The objective of this study is to understand species-habitat relationships and develop predictive capabilities of where benthic invertebrate species of interest and unique communities occur. In order to develop species-habitat relationships, this study will identify, analyze, and report on key factors that drive invertebrate species and distributions.

Methods: Study methods to achieve the objective include the following:

1. *Coordinate Scientific Review Group meetings*
Three individuals from BOEM and others from U.S. Geological Survey, Environmental Protection Agency (EPA), and National Oceanic and Atmospheric Administration (NOAA) serve as the Scientific Review Group to provide scientific review of field methods and data analyses. This group meets annually.

2. *Synthesize existing physical and biological datasets*
Existing datasets have been analyzed together with new sampling to determine the distribution of species and habitat associations more broadly throughout the region and, potentially, how they vary over time. Existing datasets include:

- The Surficial Geologic Habitat (SGH) map that currently covers Oregon and Washington was updated to include newer data and extended to include data in northern California;
- *Delta* submersible video from NOAA's National Undersea Research for invertebrates. Analysis of footage will characterize the invertebrate communities at shelf depths across a large area; and
- EPA's Environmental Monitoring & Assessment Program data for soft substrate invertebrate communities.

3. *Sampling Plan refinement of sampling design and logistics*
Sampling Plans were submitted to the SRG for review in 2010, 2011, and 2012. The plans included locations and dates for the cruises for collecting seafloor physical and biological data.

4. *Field sampling*
Surveys and sample collections occurred in six areas on the Pacific OCS for three years. Seafloor habitat information was collected by multi-beam sonar and sediment collection using methods similar to Oregon and California mapping programs. Biological sampling includes using box cores and remote observation vehicles outfitted with collecting devices to collect and identify both hard bottom and soft substrate organisms.

5. *Data analysis, synthesis, and reporting*
Collected data is being synthesized with existing biological and physical data sets from adjacent areas to build community profiles and identify unique species assemblages. Ordination, cluster, and other multivariate analyses will identify and display spatial patterns in benthic invertebrate and sediment characteristics. Regional trends are also being examined through the application of general linear modeling of selected invertebrates. Work to predict seafloor communities beyond the areas directly sampled is in progress through the use of Bayesian belief networks.

Current Status: The contract was awarded to Oregon State University as a cooperative agreement on June 2, 2010; the post-award meeting was held on July 27, 2010; and field collections began in August 2010. Three years of field work are completed. Scientific Review Group Meetings were held each year prior to the Annual Report submissions on June 2.

Final Report Due: June 2, 2014

Publications: None at this time.

Affiliated Websites: http://hmsc.oregonstate.edu/overview.html
http://pacoos.coas.oregonstate.edu/

Revised date: September 27, 2013